positioning a multi-leaf collimator between the radiation source and the treatment area to block a portion of the radiation and define a first treatment field, the collimator being positioned with leaves of the collimator extending longitudinally in a first direction;

moving the multi-leaf collimator through a first arc over the treatment area while delivering radiation through the first treatment field to the treatment area;

rotating the multi-leaf collimator about a central axis extending generally perpendicular to a plane containing at least a portion of the leaves such that the leaves define a second treatment field; and

moving the multi-leaf collimator through a second arc over the treatment area while delivering radiation through the second treatment field to the treatment area.

A1

2. The method of claim 1 wherein moving the multi-leaf collimator through a first arc comprises moving the collimator from a first position to a second position and moving the multi-leaf collimator through a second arc comprises rotating the collimator from the second position to the first position.

3. The method of claim 1 wherein the first arc has the same geometry as the second arc.

4. The method of claim 1 wherein the first arc has the same starting and ending points.

5. The method of claim 1 further comprising moving the leaves longitudinally after moving the multi-leaf collimator through the first arc to define a third treatment field and moving

the multi-leaf collimator back through the first arc in an opposite direction while delivering radiation through the third treatment field.

6. The method of claim 5 wherein moving the leaves longitudinally comprises moving the opposing pairs of leaves away from one another.

7 (Amended). A method for delivering radiation from a radiation source to a treatment area, comprising:

dividing said treatment area into a plurality of cells each having a defined treatment intensity level;

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grouping the cells to form a plurality of matrices, each of the matrices having at least one dimension approximately equal to a width of the collimator leaf;

decomposing each of the matrices into orthogonal matrices to identify a plurality of treatment fields;

positioning a multi-leaf collimator between the radiation source and the treatment area to block a portion of the radiation and define a first treatment field, the collimator being positioned with leaves of the collimator extending longitudinally in a first direction;

moving the multi-leaf collimator through a first arc over the treatment area while delivering radiation through the first treatment field to the treatment area;

rotating the multi-leaf collimator about a central axis extending generally perpendicular to a plane containing at least a portion of the leaves such that the leaves define a second treatment field; and

moving the multi-leaf collimator through a second arc over the treatment area while delivering radiation through the second treatment field to the treatment area.

8. The method of claim 7 wherein radiation is delivered with a resolution one half times the leaf width.

9. The method of claim 7 wherein the collimator leaves have a width of 1 cm and the cells are approximately 1 cm x 5 mm.

10. The method of claim 1 wherein rotating the multi-leaf collimator comprises rotating the collimator until leaves extend longitudinally in a second direction generally orthogonal to said first direction.

11. The method of claim 1 wherein delivering radiation through said first treatment field comprises delivering one half of a prescribed radiation dose and delivering radiation to said second treatment field comprises delivering a remaining half of the prescribed radiation dose.

12. A system for delivering radiation from a radiation source to a treatment area comprising:

a collimator having multiple leaves for blocking radiation from said source and defining an opening between the radiation source and said treatment area, the collimator operable to move through an arc over said treatment area and rotate about a central axis of a radiation beam emitted from said radiation source; and

a controller configured to position the leaves to define a first treatment field, move the collimator through a first arc while delivering radiation through the first treatment field, rotate

the collimator about the central axis, position the leaves to define a second treatment field, and move the collimator through a second arc while delivering radiation through the second treatment field to the treatment area.

A1 cont.

New claims 13-15 have been added as follows:

13 (New). The system of claim 12 further comprising a processor configured to divide said treatment area into a plurality of cells each having a defined treatment intensity level, group the cells to form a plurality of matrices, and decompose each of the matrices into orthogonal matrices to identify a plurality of treatment fields.

14 (New). The system of claim 13 wherein each of the matrices has at least one dimension approximately equal to a width of the collimator leaf.

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15 (New). A method for delivering radiation from a radiation source to a treatment area, comprising:

dividing said treatment area into a plurality of cells, each having a defined treatment intensity level, and grouping the cells to form a plurality of matrices defining treatment fields;

positioning a multi-leaf collimator between the radiation source and the treatment area to block a portion of the radiation and create a first treatment field defined by a least one of said plurality of matrices, the collimator being positioned with leaves of the collimator extending longitudinally in a first direction;

moving the multi-leaf collimator through a first arc over the treatment area while delivering radiation through the first treatment field to the treatment area;

rotating the multi-leaf collimator about a central axis extending generally perpendicular to a plane containing at least a portion of the leaves such that the leaves define a second treatment field defined by at least one of said plurality of matrices; and

A2 cont.

moving the multi-leaf collimator through a second arc over the treatment area while delivering radiation through the second treatment field to the treatment area.